

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 09329-004	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/CA2004/001890	International filing date (<i>day/month/year</i>) 28 October 2004 (28-10-2004)	Priority date (<i>day/month/year</i>) 31 October 2003 (31-10-2003)	
International Patent Classification (IPC) or national classification and IPC IPC: F16J 15/02 (2006.01), F16K 27/06 (2006.01), F16K 5/08 (2006.01), F16K 31/44 (2006.01)			
Applicant FLUOROSEAL INC. ET AL			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of <u>6</u> sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box. b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).			
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application			
Date of submission of the demand 24 May 2005 (24-05-2005)		Date of completion of this report 14 February 2006 (14-02-2006)	
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476		Authorized officer : Rafal Byczko (819) 956-0502	

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
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Box No. I Basis of the report

1. With regard to the language, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into
translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

, which is the language of a

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

☐ pages

☒ pages* 7 and 8

☐ pages*

received by this Authority on

received by this Authority on

as originally filed/furnished

5 July 2005 (05-07-2005)

☒ the claims:

☐ pages

☒ pages* 9

☒ pages* 10 to 12

☐ pages*

as amended (together with any statement) under Article 19

received by this Authority on

received by this Authority on

as originally filed/furnished

5 July 2005 (05-07-2005)

☒ the drawings:

☒ pages 1/22 to 22/22

☐ pages*

☐ pages*

received by this Authority on

received by this Authority on

as originally filed/furnished

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing *(specify)*:

☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing *(specify)*:

☐ any table(s) related to sequence listing *(specify)*:

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1 to 19</u>	YES
	Claims	<u>none</u>	NO
Inventive step (IS)	Claims	<u>1 to 19</u>	YES
	Claims	<u>none</u>	NO
Industrial applicability (IA)	Claims	<u>1 to 19</u>	YES
	Claims	<u>none</u>	NO

2. Citations and explanations (Rule 70.7)

D1: JP 04191581 (HIRAKAVA) 9 July 1992 (09-07-1992)
D2: JP 07167340 (NAKANISHI) 4 July 2005 (04-07-2005)
D3: US 3185487 (HAESSLER) 25 May 1965 (25-05-1965)

Novelty (N)

The subject matter of claims 1 to 19 satisfy the requirements of **PCT Article 33(2)**. Claims 1 to 19 are novel as no prior art discloses an adjustable sealing device comprising a cam and actuating means, wherein the linear movement of said actuating means creates rotation and vertical movement of said cam.

Inventive Step (IS)

Claims 1 to 19 satisfy the requirements of **PCT Article 33(3)**. No prior art alone or in combination discloses or leads towards the subject matter of these claims.

Industrial Applicability (IA)

Claims 1 to 19 satisfy the requirements of **PCT Article 33(4)** on industrial applicability as said subject matter can be made and used in industry.

placed in and out of registry with the internal flow passage 20 incident to partial rotation of the valving member 22 about the axis 28. In the illustration of FIG. 2B, the valving member 22 is shown in an open position. In this open position, the passageway 30 through the plug portion 24 registers with the internal flow passage 20. As should be readily apparent, the valving member 22 is designed to be rotated about this axis 28 to place its through passageway 30 out of registry with the valve housing's (14) internal flow passage 20 and to completely cut off flow through that internal flow passage 20.

A first or primary sealing member in the form of a sleeve or liner formed of a fluorinated hydrocarbon polymeric material such as polytetrafluoroethylene, sold under the trademark TEFLON, or equivalent material is preferably fitted about the periphery of the plug portion 24 of the valving member 22 and is aperatured in correspondency to that plug portion 24 to permit registry of the plug portions (24) through passageway 30 with the internal flow passage 20 whenever valving member 22 is in the open position illustrated in FIG. 2B. The sealing member is snugly fitted on opposite sides of the internal flow passage 20 and provides a seal between the plug portion 24 of the valving member 22 and the valve body 14.

As mentioned above, the stem or shaft portion 26 of the valving member 22 extends out of the body 14. In the illustration of FIG. 2B, this extension is through an opening in the top of the valve body 14, and for purposes of the present description, this opening will be referred to as a top opening (although the valve could clearly be oriented differently). This top opening is covered with a top seal in a form of a diaphragm 38 which is aperatured to accommodate the stem portion of the valving member 22 which passes through the top seal/diaphragm 38. The top seal/diaphragm 38 will initially be described as having been formed of a fluorinated hydrocarbon polymer such as polytetrafluoroethylene or equivalent material. However, as will be highlighted below, the design of the top seal 38 is such to permit the use of a wide range of shapes and materials to meet a correspondingly wide range of applications.

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snugly fitted on opposite sides of the internal flow passage 20 and provides a seal between the plug portion 24 of the valving member 22 and the valve body 14.

As mentioned above, the stem or shaft portion 26 of the valving member 22 extends out of the body 14. In the illustration of FIG. 2, this extension is through an opening in the top of the valve body 14, and for purposes of the present description, this opening will be referred to as a top opening (although the valve could clearly be oriented differently). This top opening is covered with a top seal in a form of a diaphragm 38 which is aperatured to accommodate the stem portion of the valving member 22 which passes through the top seal/diaphragm 38. The top seal/diaphragm 38 will initially be described as having been formed of a fluorinated hydrocarbon polymer such as polytetrafluoroethylene or equivalent material. However, as will be highlighted below, the design of the top seal 38 is such to permit the use of a wide range of shapes and materials to meet a correspondingly wide range of applications.

The top seal 38 and the cooperating components of the valve 10 with which it interacts allow movement between the valve body 14 and the plug 22 to occur without interrupting the sealing function provided by the top seal 38. Plug portion 22 has a taper from the top of the plug (proximal to stem 26) to the lower portion of the plug (distal to the stem 26). This taper of the plug 24 allows for downward adjustability of the plug by increasing the pressure of tightening bolt 75 which in turn will apply pressure to the cam 65. Figure 6 downward adjustment of plug 22 relative to the body 14 increases the service pressure of the valve 10, permitting use of higher pressurized content without leakage. Increasing the surface pressure of the valve also increases the torque required to rotate the plug 22 relative to the body 14.

As illustrated in Figure 11, tightening of the seal tightening cam 65 applies a downward force on the thrust collar 50. This downward force is principally applied to the obliquely oriented bearing surface 54 which, in turn, applies a

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force to the rotatable valving member 22 in a direction substantially perpendicular to that of the bearing surface 54. The result in the force applied to the rotating valving member 22 has two components, a first downward component and a second horizontal component. The two resulting components of force urge the top seal 38 in sealing engagement with both the stem portion 26 and the shoulder 80 of the rotatable valving member.

Figures 12-16 show another embodiment of the invention. In this embodiment, a stem sealing device 100 comprises a base 180, a seal 138, a thrust collar 150, a cam 165, a cover 182 and a bolt or screw 175.

The base 180 may be replaced by a similarly configured portion of the body of the object to be sealed. Bolts 188 are used to securely press the cover 182, the cam 165, the thrust collar 150 and the seal 138 to the base 180 and/or body.

The stem 126 is introduced in the central opening in the stem sealing device 100. Then the bolt/screw 175 is tightened as needed.

Figures 13-16 show the stem sealing device 100 in its minimum (A), intermediary (B) and maximum (C) compression positions.

Thus, it is apparent that there has been provided, in accordance with the invention, a top seal that fully satisfies the objects, aims and advantages set forth above. While the invention has been described in conjunction with a specific embodiment thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications, and variations as fall within the spirit and broad scope of the appended claims.

I claim:

1. An adjustable sealing device for preventing the leakage of a substance contained in a containment device comprising a cam and means to actuate said cam wherein the linear movement of said actuating means creates a rotational and vertical movement of said cam.
2. An adjustable sealing device as claimed in claim 1, wherein said cam actuating means comprises a bolt or screw.
3. An adjustable sealing device as claimed in claim 1, wherein said cam actuating means comprises a single bolt or screw
4. An adjustable sealing device as claimed in claim 3, further comprising a cam position indicator.
5. An adjustable sealing device as claimed in claim 4, wherein said containment device is a valve.
6. An adjustable sealing device as claimed in claim 4, wherein said containment device is a plug valve.
7. An adjustable sealing device for preventing the leakage of a substance contained in a containment device comprising:
 - a. a cover;
 - b. a cam;
 - c. a seal;
 - d. means to press said cam against said seal;wherein the linear movement of said pressing means creates a rotational and vertical movement of said cam, said vertical movement pressing said cam against said seal.

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8. An adjustable sealing device as claimed in claim 7, wherein said pressing means comprises a bolt or screw acting on said cam.
9. An adjustable sealing device as claimed in claim 8, wherein said pressing means comprises a single bolt or screw.
10. An adjustable sealing means as claimed in claim 7, further comprising a thrust collar located between said cam and said seal and wherein the linear movement of said pressing means creates a rotational and vertical movement of said cam, said vertical movement pressing said cam against said thrust collar and said thrust collar against said seal.
11. An adjustable sealing device as claimed in claim 10, wherein said means to actuate said cam comprises a bolt or screw acting on said cam.
12. An adjustable sealing device for preventing the leakage of a substance contained in a containment device having a body and a stem, said sealing device comprising:
 - a. a cover having an aperture;
 - b. means to fasten said cover onto said containment device body;
 - c. a cam;
 - d. means to actuate said cam;
 - e. a generally circular seal;

wherein said cam is rotatably fitted into said cover and wherein the linear movement of said actuating means creates a rotational and vertical movement of said cam, said vertical movement compressing said cam against said seal and said seal around said stem.
13. An adjustable sealing device as claimed in claim 12, wherein said means to actuate said cam comprises a single bolt or screw.

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14. An adjustable sealing device as claimed in claim 12, further comprising a generally circular thrust collar located between said cam and said seal and wherein the linear movement of said actuating means creates a rotational and vertical movement of said cam, said vertical movement compressing said cam against said thrust collar, said thrust collar against said seal and said seal around said stem.

15. An adjustable sealing device for preventing the leakage of a substance contained in a containment device having a body and a stem, said sealing device comprising:
 - a. a cover having an aperture;
 - b. means to fasten said cover onto said containment device body;
 - c. a cam rotatably fitted into said cover;
 - d. means to actuate said cam;
 - e. a generally circular seal;

wherein said cam has an angular lower portion, wherein said seal has a flat outer portion and an angular inner portion and wherein the linear movement of said means to actuate said cam creates a rotational and vertical movement of said cam, said vertical movement compressing said cam against said thrust collar, said thrust collar against said seal and said seal around said stem.

16. An adjustable sealing device as claimed in claim 15, wherein said means to actuate said cam comprises a bolt or screw acting on said cam.

17. An adjustable sealing device as claimed in claim 16, wherein said means to actuate said cam comprises a single bolt or screw.

18. An adjustable sealing device as claimed in claim 15, further comprising a generally circular thrust collar having a flat outer portion and an angular inner portion and located between said cam and said seal and wherein the linear movement of said actuating means creates a rotational and

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vertical movement of said cam, said vertical movement compressing said cam against said thrust collar, said thrust collar against said seal and said seal around said stem.

19. An adjustable sealing device for preventing the leakage of a substance contained in a containment device comprising a cam, means to actuate said cam and a cam position indicator wherein the linear movement of said actuating means creates a rotational and vertical movement of said cam.